

deceased baronet, who was born at Rochdale on July 20, 1804, was for some time secretary to the Committee of Council on Education, and whilst fulfilling the duties of this post he was mainly instrumental in establishing a system of school inspection by officers appointed by the Government. On his resignation he was succeeded by Mr. Lingen, now permanent secretary of the Treasury, who was succeeded in his turn by Sir Francis R. Sandford. Under Sir James's scheme teachers were divided into nine grades, and received money grants, not according to the number of their scholars or of their passes, but largely, according to the grade they had obtained by examination or service. He was hostile to the Revised Code, which was introduced, about twelve years after his resignation, by Mr. Lowe and his successor. It is undoubtedly to Sir James that we owe the training colleges and the pupil teacher system, without which it would have been impracticable for us to advance educationally even as we have done. At the close of the year 1849 he received a baronetcy at the recommendation of Lord Russell, then Prime Minister. In 1870 he received the honorary degree of D.C.L. from the University of Oxford.

**SPELLING REFORM.**—An influential Conference on English Spelling Reform was held on Tuesday at the Society of Arts, under the presidency of the Rev. A. H. Sayce and Sir Charles Reed. Many weighty reasons were urged against the present system, and a deputation consisting of Prof. Max Müller, the Rev. A. H. Sayce, Dr. Morris, Mr. Ellis, Mr. Sweet, Dr. Murray and others, was appointed to wait upon the Education Department in reference to the subject. A proposal having the support of such names as we have mentioned deserves at least serious consideration.

**A SIBERIAN UNIVERSITY.**—It has been finally decided that the New Siberian University, to which we referred some time since, is to be established at Omsk. So long ago as 1803 a wealthy Uralian landowner named Demidoff gave 100,000 roubles to the Treasury, to be expended in the establishment of a University. This sum has now swollen to 150,000 roubles, to which a Siberian merchant has added 100,000 roubles more. Orders have been issued to begin the construction of the university buildings at once, so as to have them ready for occupation by July, 1880. The estimated cost of the future professional staff, together with other incidental expenses connected with the university, is 307,000 roubles yearly.

## SOCIETIES AND ACADEMIES

### LONDON

**Mathematical Society, May 10.**—Lord Rayleigh, F.R.S., president, in the chair.—Mr. Tucker communicated a short account of a paper by Dr. Hirst on the correlation of two planes. In a former paper on the subject (*Proceedings*, vol. v., p. 40), the nature and properties were described first, of an ordinary correlation satisfying any eight given conditions; secondly, of an exceptional correlation of the first order, possessing either a singular point or a singular line in each plane, and satisfying seven conditions; and thirdly, of an exceptional correlation of the second order, having in each plane not only a singular point but also a singular line passing through that point, and satisfying six conditions. Moreover, the two following numerical relations were established between the  $(\pi, \lambda)$  exceptional correlations of the first order, with singular points and singular lines respectively, which satisfy any seven conditions, and the  $(\mu, \nu)$  ordinary correlations, which, besides satisfying these same conditions, possess a given pair of conjugate points or conjugate lines respectively ( $2\nu = \mu + \pi$ ,  $2\mu = \nu + \lambda$ ). It was by means of these relations that the number of ordinary correlations was determined which satisfy any eight elementary conditions. Before they could be applied, however, the exceptional correlations of the first order which satisfy any seven elementary conditions had to be directly determined, and this determination not unfrequently necessitated the consideration of the projective properties of curves of high order. In the present paper the writer shows that the object just referred to can be attained in a very much simpler manner by means of two general relations, hitherto unobserved, connecting the number of exceptional correlations of the second order, which satisfy any six conditions, with the numbers of exceptional correlations of the first order which, besides satisfying the six conditions in question, possess a given pair either of conjugate points or conjugate lines.—The secretary then read part of a paper by Prof. H. Lamb, of the

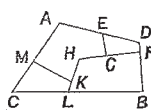
University of Adelaide, on the free motion of a solid through an infinite mass of liquid. Suppose that we have a solid body of any form immersed in an infinite mass of perfect liquid, that motion is produced in this system from rest by the action of any set of impulsive forces applied to the solid, and that the system is then left to itself. The equations of motion of a body under these circumstances have been investigated independently by Thomson and by Kirchhoff, and completely integrated for certain special forms of the body. The object of the present communication is, in the first place, to examine the various kinds of permanent or *steady* motion of which the body is capable, without making any restrictions as to its form or constitution; and, in the second, to show that when the initiating impulses reduce to a couple only, the complete determination of the motion can be made to depend upon equations identical in form with Euler's well-known equations of motion of a perfectly free rigid body about its centre of inertia, although the interpretation of the solution is naturally more complex. Free use is made throughout the paper of the ideas and the nomenclature of the theory of screws as developed and established by Dr. Ball.—Herr Weichold (Head-master of the Johanneum, Zittau, Saxony) sent a paper (read in part by the secretary) containing a solution of the irreducible case, *i.e.*, of the problem to express the three roots of a complete equation of the third degree, in the case of *all* these roots being *real*, directly in terms of its coefficients, by means of purely algebraical and really performable operations, whose number shall always be limited, except in the case where all these roots are incommensurable.—Mr. H. Hart made three communications: First On the "Kinematic Paradox."—Prof. Sylvester has described a system of Peaucellier's cells, the poles of which all move in a straight line, but two of which not directly connected always remained at a constant distance. Such a result is very easily obtained by means of the following relations connecting six points *A, B, C, D, E, F*, lying on a straight line. If

$$\begin{array}{c} \text{E} \quad \text{D} \quad \text{F} \\ \text{A} \quad \text{C} \quad \text{B} \\ \text{AB} \cdot \text{AC} = a^2 \\ \text{BC} \cdot \text{BD} = 4a^2 \\ \text{EB} \cdot \text{ED} = a^2 \\ \text{FA} \cdot \text{FE} = 2a^2 \end{array} \quad \left. \vphantom{\begin{array}{c} \text{E} \quad \text{D} \quad \text{F} \\ \text{A} \quad \text{C} \quad \text{B} \\ \text{AB} \cdot \text{AC} = a^2 \\ \text{BC} \cdot \text{BD} = 4a^2 \\ \text{EB} \cdot \text{ED} = a^2 \\ \text{FA} \cdot \text{FE} = 2a^2 \end{array}} \right\} \text{ then } \text{FB} = a.$$

He then spoke on the solution of the algebraical equation  $f(x) = 0$  by linkwork, considering three points, the preparation of the equation (put under the form  $\frac{A}{x+a} + \frac{B}{x+b} + \dots = \lambda$ ), the representation of the terms of this equation, and the method of adding these terms. He showed that for the solution of the cubic  $x^3 + px^2 + qx + r = e$ , treated under the form—

$$x + p + \frac{\left(q - \frac{r}{p}\right)x}{x^2 + \frac{r}{p}} = 0,$$

two reciprocators alone are required. He then spoke on the production of circular and rectilinear motion. The particular problem considered, he thus enunciated "to find if possible the relations that must exist between the fourteen segments of the bars placed as in the figure in order that the system may be capable of free motion." He showed that seven equations can be obtained connecting the fourteen quantities only, so that any seven being given, the remaining seven can be determined in terms of them.—Mr. Hart then proceeded to the application to the cases of 5-bar motion, laid before the Society at its April meeting. Mr. Kempe stated that the cases submitted by Mr. Hart at the previous meeting had also occupied some of his attention, and he proceeded to remark that he had determined the positions that the lines *GE, KM* must have, and that the determination of one involved the determination of the other, as the position of either turned upon the fact that the angles at *A* and *H* must be equal. Prof. Cayley also made a few remarks on the subject. Mr. J. W. L. Glaisher stated that he had had all the cases in which there are more than fifty consecutive composite numbers looked out from Burckhardt's and Dase's tables, which cover six millions, and that he had found that in the first million there is a stretch of 111 numbers without a prime (about 310,000), and a stretch of 113 numbers without a prime (about 500,000); so that there are two very long sets of composite



numbers in the first million, and these are longer, he thought, than anyone would have supposed likely. He exhibited the lists from which he drew the above results. Questions were put to the meeting, for information, by Profs. Cayley and Clifford.

Geological Society, May 9.—Prof. P. Martin Duncan, F.R.S., president, in the chair.—James Dorrington, Rev. E. R. Lewis, Edward Penton, Henry Rosales, and Henry White were elected fellows of the Society.—On the Agassizian genera *Amblypterus*, *Paleoniscus*, *Gyrolepis*, and *Pygopterus*, by Ramsay H. Traquair, F.R.S.E. The author's object in this paper was to discuss the characters by which the above genera of fossil fishes have been supposed to be distinguished in the case of specimens from the carboniferous series.—On the cinate vernal, fructification, and varieties of *Sphenopteris affinis*, and on *Staphylopteris (?) peachii*, Etheridge and Balfour, a genus of plants new to British rocks, by C. W. Peach, A.L.S., communicated by Robert Etheridge, F.R.S., V.P.G.S.—On the occurrence of a Macrurous Decapod (*Anthrapalamon woodwardi*, sp. nov.) in the red sandstone, or lowest group of the carboniferous formation in the south-east of Scotland, by Robert Etheridge, jun., F.G.S. After giving a detailed bibliography of the palæozoic malacostracous crustacea, the author described the remains of a small crustacean from the lower group of the carboniferous formation near Dunbar, and discussed its affinities and systematic position, which he regarded as being among the Macrurous Decapods, although the absence of the eyes in the preserved specimens, and some other characters, rendered it doubtful whether it might not in some respects approach the Stomapoda. Its position among the Macrura seemed, however, to be established by the well-developed abdominal somites and telson. He referred the fossil to Salter's genus, *Anthrapalamon*, and named the species *A. woodwardi*.—On the stratigraphical position of the corals of the Lias of the Midland and Western Counties of England and of South Wales, by R. F. Tomes, communicated by R. Etheridge, F.R.S., V.P.G.S. The object of this paper was to give the precise stratigraphical position of the species of liassic corals collected by the author and his friends in the districts above mentioned. He noticed forty-one species, of which fifteen were described as new.

#### PARIS

Academy of Sciences, May 21.—M. Peligot in the chair.—The following papers were read:—Meridian observations of small planets at the Paris Observatory during the first quarter of 1877, by M. LeVerrier.—On Gay-Lussac's law of volumes, by M. H. St. Claire Deville. He considers recent researches have neither invalidated nor added to the law.—On an algebraic method for obtaining the *ensemble* of the fundamental variants and co-variants of a binary form, and of any combination of binary forms (continued), by Mr. Sylvester.—Report on M. Rou-daire's project of making an interior sea in the south of Tunisia and the Province of Constantine. M. Favé reports favourably; but on the points, whether the sea would not dry up, whether the vapours would benefit neighbouring lands and not be carried to the sea by winds, and whether the eastern Algerian and Tunisian climate would recover its old fertility, and be improved hygienically, MM. Daubrée and Dumas (while adopting the general conclusions) express hesitation, and desire further researches.—Report on a memoir of M. Stanislas Meunier, entitled "Composition and Origin of the Diamantiferous Sand of Toit's Pan (in South Africa). M. Meunier has separated several mineral species not before noticed there, and offers an ingenious explanation of the way of filling up those vertical pits.—On the employment of oxygen of high tension as a process of physiological investigation; poisons and virus, by M. Bert. There is in an-thracic blood a toxic and virulent principle which resists the action of compressed oxygen and alcohol, and which can be isolated like diastase. M. Bert is studying its nature and its relation to the bacteria. Lymph, too, and the pus of glands, by resisting compressed oxygen, show that their virulent action is not due to living beings or cells.—On the employment of rotatory discs for the study of coloured sensations, by M. Rosenstiehl.—Dehydrated oxalic acid may serve to characterise polyatomic alcohols; chemical function of inosite, by M. Lorin.—Decomposition of chlorhydrate of trimethylamine by heat, by M. Vincent. This substance might be utilised to give ammoniacal products and pure chloride of methyl, the latter yielding the methylated aniline colours or pure methylic alcohol.—Observations of a disease of the vine known commonly as *white*, by Mr. Schnetzler.—New spectroscopic method,

by Mr. Langley. Two spectra from the north and south poles of the sun respectively are put in juxtaposition (a considerable dispersion being used); let the instrument be adjusted so that the lines in both are continuous. On turning the spectroscope round its axis of collimation till the light comes from the east and west extremities of the equator the solar lines are displaced, while the atmospheric remain continuous. On turning 180° the spectra glide on one another like a Vernier on a scale. The point is, *simultaneous* observation of the *different* displacement of the solar and the atmospheric lines in the two spectra.—On a transmission of motion, by M. Rozé.—On the spectrum of the electric spark in a compressed gas, by M. Cazin. From experiments on air and nitrogen he concludes that the electric spark in a gas is similar to an ordinary hydrocarbon flame. In each there are luminous particles giving a spectrum of lines, and solid or liquid particles giving a continuous spectrum. The latter (in the case of the spark) come from the electrodes and the walls. When the pressure is increased these particles are more abundant; the continuous spectrum becomes more brilliant, and finally makes the linear spectrum disappear. The luminous spark called an *aureole* is of gaseous particles, and is to the total spark what the blue base of a candle flame is to the entire flame.—Studies on organ pipes, by M. Philbert.—On some new models of radiometers, by Mr. Crookes.—Thermo-chemical study of aniline and some other bodies of the same group, by M. Louguinine.—On the nitrates of bismuth, by M. Yvon.—On the properties of resorcin; molecular volumes, by M. Calderon. Resorcin in solution behaves as if it were solid and isolated from the solvent. In presence of water and potash it absorbs oxygen, though very slowly.—Anatomical characters of the blood in new-born infants during the first days of life, by M. Hayem. *Inter alia*, the red corpuscles are much more unequal in size than in the adult, and seem of a different composition. The number (in a cubic metre) is nearly as high as in the most vigorous adult. The number of white corpuscles is three or four times as great as in an adult. When the infant has reached its minimum weight (about the third day) the number of these suddenly falls; various fluctuations ensue (which are described).—On a process for estimation of alcohol in liquids, by M. Fleury.—On the filling of fissures in chalk with silex, by M. Robert.—M. Vinot presented a celestial map of the equatorial region.

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